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ANNUAL REPORT OF THE 1992 WESTERN PACIFIC LONGLINE FISHERY

Robert A. Dollar

Honolulu Laboratory
Southwest Fisheries Science Center
National Marine Fisheries Service, NOAA
2570 Dole Street, Honolulu, Hawaii 96822-2396

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This Administrative Report is issued as an informal document to ensure prompt dissemination of preliminary results, interim reports, and special studies. We recommend that it not be abstracted or cited.

PREFACE

The Western Pacific Regional Fishery Management Council (WPRFMC) developed the Pelagic Species fishery management plan (FMP) to manage the pelagic resources authorized by the Magnuson Fishery Conservation and Management Act of 1976. This FMP regulates the fisheries for tuna, swordfish, marlin, and other pelagic species. The FMP for the Pelagic Fisheries of the Western Pacific Region was first implemented by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA, NMFS) on March 23, 1987.

Beginning in 1990 the WPRFMC recommended several changes to the FMP for the Western Pacific Region. Two of these changes became effective under emergency Federal regulations beginning November 27, 1990: requiring Federal longline fishing permits and logbooks to be filed by all operators of fishing vessels conducting longline fishing operations within the U.S. Exclusive Economic Zone (EEZ) from 3 to 200 nmi offshore American Samoa, Guam, Hawaii, the Northern Mariana Islands, and U.S. possessions in the western Pacific. The Fishery Monitoring and Economics Program (FMEP) of the Honolulu Laboratory, Southwest Fisheries Science Center, NMFS, NOAA, collects biological and economic information from domestic longline fishing vessels permitted to fish within the western Pacific U.S. EEZs. Only information on domestic commercial longline vessels landing their catch or based in Hawaii is presented in this report.

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INTRODUCTION

Historically, domestic longline fishing vessels have operated in the Hawaiian Islands continuously each year since the late 1940s (Hawaii Division of Aquatic Resources, unpublished records). Over the past few years, the pelagic longline fishery has grown to be the largest and most prominent domestic commercial fishery in Hawaii. The number of permitted longline vessels has more than quadrupled, from approximately 37 vessels in 1987 (Kawamoto et al. 1989) to 166 vessels by the end of 1992. Initially, the Western Pacific Regional Fishery Management Council's (WPRFMC) fishery management plan (FMP) for pelagic species relied on shoreline monitoring by the National Marine Fisheries Service's (NMFS) Fishery Monitoring and Economics Program (FMEP) for longline off-loading data, and on the HDAR commercial fishing catch reports for landings and fishing effort data. However, with the dramatic expansion of the fishery, the increased interaction between the longliners and various small trollers and handliners, as well as reports of interactions between the longline vessels operating in the Northwestern Hawaiian Islands (NWHI) and endangered Hawaiian monk seals (see Table 1 for scientific names), a Federal logbook system for domestic longliners operating in the western Pacific region (Fig. 1) was implemented in November 1990.

Information on current landings, fishing effort, catch-per-unit effort (CPUE), vessel operations and interactions with endangered and protected species included in this report are all based on Federal longline logbook data from the NMFS, FMEP for 1992. Logbook procedures are summarized in Dollar and Yoshimoto (1991).

RECENT DEVELOPMENTS

Events affecting the longline fishery in Hawaii in 1992 included the implementation of Amendment 6 to the FMP for the Western Pacific Region. The purpose of this amendment is to make the FMP and its regulations consistent with amendments to the Magnuson Fishery Conservation and Management Act (MFCMA). In 1990 amendments to the MFCMA established exclusive U.S. jurisdiction over tuna fisheries within the EEZ. Amendment 6 provides for tunas to be included in the fishery management segment of the FMP. Under this provision, waters in the EEZ that are now closed to domestic longline vessels to prevent gear conflicts and incidental take of protected species are also closed to foreign vessels fishing for pelagic species, including tunas.

Other developments involved the approval of a final rule to Amendment 5 reducing the size of the initial (1991) Federally mandated 50- to 75-nmi longline exclusion zone around the main

Hawaiian Islands (MHI) created to prevent longline gear conflicts. This was effected by many reactions expressed by fishermen, fish brokers, processors, and other industry representatives. Longline fishermen claimed catches had decreased, and brokers argued that the quality of certain species of fish was lower because longline vessels were forced to fish farther from shore and had to keep their fish on board longer before off-loading. Some vessel operators reportedly discontinued fishing altogether because of the lack of skill or experience necessary to successfully fish in waters beyond the closures. Effective October 1, 1992, the final rule was implemented to allow longline vessels to fish within 25 nmi from the windward shores of Kauai, Maui, and Hawaii and within 50 nmi off the windward coast of Oahu. This allowed longliners to access traditional bigeye tuna grounds during the winter months. Closures on the leeward side of the islands remained at 50 nmi for Maui and Hawaii, and 75 nmi for Kauai and Oahu throughout the year (Figs. 2A and 2B).

During 1990-91 when the most rapid expansion of the longline fleet occurred (Dollar 1991), there was far-reaching experimental fishing by the fleet to find the most abundant species and productive fishing areas. As newly arrived longliners settled into their fishing strategies during 1992, it became evident that increasing numbers of vessels targeting swordfish instead of tunas would become more commonplace throughout the fleet. Swordfish continued to be the major component in the 1992 fishery in terms of growth. Targeting swordfish still appears to be most prevalent during February-June, which accounts for more than twice the number of swordfish-directed trips during the rest of the year. Seasonal abundance of swordfish appeared to be greatest in those months, whereas tunas (predominately bigeye) and tuna-directed trips were the most abundant from October-March.

During July-September 1992, there were approximately 40 percent fewer longline trips and 15 percent fewer longline vessels fishing compared to the other quarters. A similar third quarter effort reduction was observed in 1991. It was thought that the 1991 reduction might be related to the emergency regulations implementing the closures around the main Hawaiian Islands (MHI) that went into effect on June 14, 1991 and were extended until mid-December 1991. However, the third quarter reduction in effort may be an annual phenomenon.

A topic of much discussion during 1992 was the modification of permit transfer and vessel replacement regulations for the remainder of the moratorium which expires in April 1994. Currently, permits issued to longliners can be transferred only once during the 3-year moratorium, and vessel owners may replace their vessels only if the new vessels do not represent an increase in harvesting capacity. From the start of the moratorium on November 27, 1990 to the present, a number of

industry representatives and participants in the longline fishery have maintained that these restrictive regulations have had negative impacts on the fishery. On the other hand, participants in non-longline fisheries have expressed concerns that if transfer and vessel replacement rules are modified, longline effort may escalate to a higher level than even the present level of activity. This increase in effort is predicted to come from inactive permits becoming active and vessels with greater harvesting capacity entering the longline fishery. A discussion of the decision of the Council on this issue will be included in the annual report of the longline fishery in 1993.

LONGLINE FLEET OPERATIONS

At the close of 1992, there were 166 Federally permitted longline vessels registered in Hawaii (these are referred to as limited entry vessels or "LE" vessels). During the year 3 permit holders were allowed to transfer their permits to replacement vessels, 2 of which were active in the longline fishery. There were 45 "inactive" vessels: 26 were fishing out of state, 1 fishing for bottomfish (had bottomfish/longline permit), 4 were lobster fishing (had lobster/longline permits), and 14 did not submit any records of having participated in the Hawaii longline fishery (no longline logbook reports were received). The vessels which did not submit any logbook records were either under repair, impounded, for sale, handlining, or inactive for unknown reasons. This left 123 LE vessels¹ actively participating in the Hawaii longline fishery at the end of the year.

Classes of limited entry longline vessels in 1992 were categorized by size as small (less than 55 feet in length), medium (55 to 74 feet in length) and large (vessels over 74 feet). During 1992, there were a total of 41 small-sized vessels, 70 medium-length vessels, and 55 large vessels. Inactive vessels included 17 small, 12 medium and 16 large-sized vessels.

During 1992, ten vessels fished exclusively outside the Hawaii EEZ, while only nine fished solely inside the MHI EEZ, and 104 fished in both areas.

On two occasions, domestic longline vessels with limited entry permits transshipped shark fins from foreign longline fishing vessels.

¹Numbers of active, inactive, and permitted vessels may not be in full agreement in all cases because not all permittees have functional vessels (e.g., vessel may have sunk). In 1992 there were 168 "eligible" LE longline vessels, 2 of which were replacement vessels.

NUMBER OF TRIPS

Logbook data received and summarized (by date of landing) for 1992 indicate that there were 1,261 trips made by 123 vessels fishing within all areas: the MHI EEZ, the NWHI EEZ, areas outside the EEZ, and areas in other U.S. territories. These statistics may be compared to 1991, when 1,665 trips were completed by 140 longline vessels within the same areas. Data from two 1992 trips from two vessels were never received. Consequently, that information is not included in this year's report.

Logbook data for 1992 were separated into trip type categories according to targeted species: Tuna, swordfish, or combination (mixed trips; targeting swordfish and/or tuna). Identification or determination of target species usually is made by FMEP personnel from dockside interviews with the captain or deck boss whenever possible. When the captain is unavailable for an interview, or the log sheets are mailed in, the trip type is determined by analyzing the catch composition, set times, number of light sticks used, area fished and previous history of trip types for that vessel. However, new information received during the past year indicates that more vessels may have targeted swordfish than our summaries show. Accordingly, FMEP will reevaluate the criteria for trip types in 1993.

Current summaries of trip types (by date of haul) for 1992 show that 288 trips (22 percent) targeted swordfish, 468 (36 percent) were tuna directed, and 547 (42 percent) were mixed trips.

FISHING EFFORT

Total fishing effort decreased by 5 percent from 12.3 million hooks set in 1991 to 11.7 million hooks set in 1992 (Table 2).² Figure 3 depicts fishing effort by number of trips, sets and vessels for all areas fished. Figure 4A compares quarterly fishing effort (number of hooks) set by area for 1991-92.

Tables 3-5 show catch and effort inside the Hawaii EEZ, and Table 6 depicts catch and effort outside the Hawaii EEZ. Over 40 percent of the fishing effort for 1992 was within the 200-mile EEZ of the MHI (a 14 percent decrease from 1991), where bigeye tuna comprised the most landings. About 6 percent of the fishing effort was within the 200-mile EEZ of the NWHI (a 3 percent decrease), where swordfish constituted the largest landings, and about one-half of the effort was outside the Hawaii EEZ (a

²Figures rounded off for purposes of comparison. All summary tables are by date of haul.

17 percent increase), with most landings also being swordfish (Figure 4B). Tables 7-9 summarize catch, effort, landings, and CPUE (number caught per 1,000 hooks) for swordfish, tuna, and mixed trips.

CATCH AND LANDINGS

Table 2 summarizes 1992 catch, effort, landings and CPUE for pelagic species caught for all areas. Swordfish continued to be the largest component of the landings in 1992 ($N = 71,000$ fish landed), followed by mahimahi ($N = 53,900$) and bigeye tuna ($N = 42,750$). More than one and a half times as many swordfish were landed in the first half of 1992 ($N = 43,680$) as were landed in the second half ($N = 27,340$). The total number of swordfish caught and retained comprised 30 percent of the total number of fish landed ($N = 236,400$). Landings for bigeye and yellowfin tunas were more similar throughout the year and comprised 18 percent and 3 percent, respectively, of the 1992 landings. About 24 percent more "other billfish" (blue and striped marlins, spearfish, etc.) were landed in the first half of the year ($N = 14,400$) than in the second half. It should be noted that all data shown in the logbook summary tables for blue and striped marlins caught or landed in 1992 should be viewed carefully because these species are sometimes misidentified by longline fishermen when they enter the information in their logbooks. The number of sharks reported in 1992 also substantially increased (25 percent above 1991) and accounted for the largest component of the catch ($N = 94,880$), but relatively few were landed ($N = 3,600$). Blue sharks represented approximately 26 percent of the total catch for 1992, compared to 2 percent for mako, thresher, and miscellaneous sharks. Sharks caught and released (dead, alive, or finned) may not always be recorded in the logs.

Figure 5 depicts seasonal patterns in the longline fishery (by number caught) for each quarter, and Figure 6 shows the species composition (percent of total number caught) for 1992.

Preliminary average weights from dockside and wholesale market monitoring in Honolulu suggest that landings of swordfish in 1992 increased significantly to approximately 10.9 million pounds (round weight) (Ito 1993). Landings of bigeye tuna (3.7 millions pounds) were approximately the same as in 1991, while landings of yellowfin tuna (0.9 million pounds) declined.

CATCH-PER-UNIT EFFORT (CPUE)

Billfish (e.g., blue and striped marlins, swordfish) CPUE (number caught per 1,000 hooks) for all areas in 1992 stayed about the same as in 1991 at 8.6. The CPUE for other pelagic management unit species (PMUS); i.e., mahimahi, wahoo, and

sharks, increased by 4 to 13.2 in 1992, and CPUE for tunas increased slightly to 6.4. Figure 7 compares quarterly CPUE for the majority of the species caught during 1991-92.

INTERACTIONS WITH ENDANGERED AND PROTECTED SPECIES

Summaries of interactions with endangered and threatened species in the longline fishery (Table 10) are based on information reported in the daily longline logbook entries and were prepared by the Pacific Area Office, NMFS.

It should be noted that these data are unedited and that fishermen may often sight or interact with greater numbers of protected species than are indicated in their logbooks. Consequently, the number of sightings or interactions shown are not necessarily an accurate indication of the actual number of interactions.

During calendar year 1992, Hawaii-based longline vessels reported a total of 180 interactions with endangered and protected marine species. Interaction data from logbooks submitted to NMFS indicated that 55 percent of the interactions were with seabirds and 36 percent with marine turtles.

All interactions with protected species were reported as number of animals released alive, injured, or dead, since it is unlawful to retain protected species. Logbook data showed 51.1 percent of the interactions involved animals that were released alive, 41.7 percent released dead (one dolphin, 71 seabirds, three unidentified species), and 7.2 percent released injured.

Eighty-four percent of the interactions reportedly occurred outside the U.S. EEZ while 16 percent took place inside the zone. In the case of marine turtles, 82.8 percent of interactions were outside the EEZ, and 17.2 percent within the EEZ.

The reported rate of interaction for turtles was calculated at 2.0 per million hooks inside the EEZ; outside the EEZ it was 8.7 turtles per million hooks set. The number of reported interactions overall decreased 20.1 percent from the previous year consistent with a decrease in fishing effort during 1992. However, the rate of turtle interaction within the EEZ remained unchanged between 1991-1992. Although fishing effort increased outside the EEZ, reported turtle interaction rates decreased.

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Table 1.--List of common and scientific names of fishes and endangered or protected species commonly encountered by fishing vessels in the western Pacific longline fishery.

Common name	Scientific name
Pelagic Management Unit Species	
Swordfish	<i>Xiphias gladius</i>
Blue marlin	<i>Makaira mazara</i>
Black marlin	<i>Makaira indica</i>
Striped marlin	<i>Tetrapturus audax</i>
Shortbill spearfish	<i>T. angustirostris</i>
Sailfish	<i>Istiophorus platypterus</i>
Mahimahi	<i>Coryphaena hippurus</i>
Wahoo (ono)	<i>Acanthocybium solandri</i>
Blue shark	<i>Prionace glauca</i>
Thresher (big eye)	<i>Alopias superciliosus</i>
Mako (short fin)	<i>Isurus oxyrinchus</i>
White tip (oceanic)	<i>Carcharhinus longimanus</i>
Tiger shark	<i>Galeocerdo cuvieri</i>
Miscellaneous sharks	<i>Carcharhinidae, Alopiidae, Sphyrnidae and Laminidae</i>
Tunas	
Bigeye tuna	<i>Thunnus obesus</i>
Yellowfin tuna	<i>T. albacares</i>
Albacore	<i>T. alalunga</i>
Kawakawa	<i>Euthynnus affinis</i>
Skipjack tuna	<i>Katsuwonus pelamis</i>
Miscellaneous	
Moonfish	<i>Lampris guttatus</i>
Lancetfish	<i>Alepisaurus</i> spp.
Walu	<i>Lepidocybium flavobrunneum</i>
Barracuda	<i>Sphyraena barracuda</i>
Brown stingray	<i>Dasyatis violacea</i>
Endangered or Protected Species	
Hawaiian monk seal	<i>Monachus schauinslandi</i>
Humpback whale	<i>Megaptera novaengliae</i>
Killer whale	<i>Orcinus orca</i>
False killer whale	<i>Pseudorca crassidens</i>
Bottlenose dolphin	<i>Tursiops truncatus</i>
Rough-toothed dolphin	<i>Steno bredanensis</i>
Spinner dolphin	<i>Stenella longirostris</i>
Green turtle	<i>Chelonia mydas</i>
Loggerhead turtle	<i>Caretta caretta</i>
Olive ridley turtle	<i>Lepidochelys olivacea</i>
Hawksbill turtle	<i>Eretmochelys imbricata</i>
Leatherback turtle	<i>Dermochelys coriacea</i>
Laysan albatross	<i>Diomedea immutabilis</i>
Black-footed albatross	<i>D. nigripes</i>
Brown booby	<i>Sula leucogaster plotus</i>

Table 2.--Hawaii's domestic longline logbook summary, by date of haul, from January-December 1992 (all areas).

Trip information			
Number of vessels		123	
Number of trips		1,303	
Number of sets		11,520	
Number of hooks set		11,686,581	
Number of light sticks used		3,326,909	
Minimum hooks per set		100	
Maximum hooks per set		2,310	
Species catch information			
Species class	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin ¹	4,378	4,506	0.39
Swordfish	71,024	74,273	6.36
Striped Marlin	15,351	15,965	1.37
Other	5,553	5,655	0.48
Total	96,306	100,399	8.59
Other Pelagic Management Unit Species			
Mahimahi	53,932	56,669	4.85
Wahoo	2,427	2,446	0.21
Sharks ²	3,605	94,886	8.12
Total	59,964	154,001	13.18
Tunas			
Albacore	16,266	19,805	1.69
Bigeye	42,752	43,733	3.74
Yellowfin	7,658	7,856	0.67
Other	3,443	3,493	0.30
Total	70,119	74,887	6.41
Miscellaneous	10,023	10,778	0.92

¹Blue and striped marlins are misidentified in some cases.

²Blue sharks are incorrectly logged as "kept" in some cases.

Table 3.--Hawaii's domestic longline logbook summary, by date of haul, from January-December 1992 (Main Hawaiian Islands).

Trip information			
Number of vessels		114	
Number of trips		755	
Number of sets		4,129	
Number of hooks set	4,863,644		
Number of light sticks used	402,638		
Minimum hooks per set		150	
Maximum hooks per set		2,310	
Species catch information			
Species class	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin ¹	2,726	2,749	0.57
Swordfish	6,779	7,061	1.45
Striped Marlin	9,630	9,811	2.02
Other	3,316	3,358	0.69
Total	22,451	22,979	4.72
Other Pelagic Management Unit Species			
Mahimahi	13,085	13,298	2.73
Wahoo	1,187	1,192	0.25
Sharks ²	2,037	11,737	2.41
Total	16,309	26,227	5.39
Tunas			
Albacore	3,928	3,973	0.82
Bigeye	22,468	22,879	4.70
Yellowfin	3,721	3,832	0.79
Other	1,956	1,979	0.41
Total	32,073	32,663	6.72
Miscellaneous	5,757	6,017	1.24

¹Blue and striped marlins are misidentified in some cases.

²Blue sharks are incorrectly logged as "kept" in some cases.

Table 4.--Hawaii's domestic longline logbook summary by Date of haul; from January-December 1992 (Northwestern Hawaiian islands).

Trip information			
Number of vessels		63	
Number of trips		134	
Number of sets		743	
Number of hooks set		680,831	
Number of light sticks used		326,182	
Minimum hooks per set		100	
Maximum hooks per set		1,950	
Species catch information			
Species class	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin	218	244	0.36
Swordfish	4,909	5,228	7.68
Striped Marlin	1,595	1,719	2.52
Other	323	327	0.48
Total	7,045	7,518	11.04
Other Pelagic Management Unit Species			
Mahimahi	2,262	2,321	3.41
Wahoo	77	77	0.11
Sharks	229	9,042	13.28
Total	2,568	11,440	16.80
Tunas			
Albacore	299	309	0.45
Bigeye	2,512	2,556	3.75
Yellowfin	386	387	0.57
Other	183	184	0.27
Total	3,380	3,436	5.05
Miscellaneous	709	726	1.07

¹Blue and striped marlins are misidentified in some cases.

²Blue sharks are incorrectly logged as "kept" in some cases.

Table 5.--Hawaii's domestic longline logbook summary by date of haul; from January-December 1992 (Inside Hawaii EEZ).

Trip information			
Number of vessels		122	
Number of trips		838	
Number of sets		4,872	
Number of hooks set		5,544,475	
Number of light sticks used		728,820	
Minimum hooks per set		100	
Maximum hooks per set		2,310	
Species catch information			
Species class	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin ¹	2,944	2,993	0.54
Swordfish	11,688	12,289	2.22
Striped Marlin	11,225	11,530	2.08
Other	3,639	3,685	0.66
Total	29,496	30,497	5.50
Other Pelagic Management Unit Species			
Mahimahi	15,347	15,619	2.82
Wahoo	1,264	1,269	0.23
Sharks ²	2,266	20,779	3.75
Total	18,877	37,667	6.79
Tunas			
Albacore	4,227	4,282	0.77
Bigeye	24,980	25,435	4.59
Yellowfin	4,107	4,219	0.76
Other	2,139	2,163	0.39
Total	35,453	36,099	6.51
Miscellaneous	6,466	6,743	1.22

¹Blue and striped marlins are misidentified in some cases.

²Blue sharks are incorrectly logged as "kept" in some cases.

Table 6.--Hawaii's domestic longline logbook summary by date of haul; from January-December 1992 (Outside Hawaii EEZ).

Trip information			
Number of vessels		113	
Number of trips		774	
Number of sets		6,635	
Number of hooks set		6,126,076	
Number of light sticks used		2,597,289	
Minimum hooks per set		100	
Maximum hooks per set		2,200	
Species catch information			
Species class	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin ¹	1,431	1,506	0.25
Swordfish	59,283	61,920	10.12
Striped Marlin	4,125	4,434	0.72
Other	1,907	1,963	0.32
Total	66,746	69,823	11.41
Other Pelagic Management Unit Species			
Mahimahi	38,579	41,044	6.71
Wahoo	1,155	1,169	0.19
Sharks ²	1,337	73,724	12.05
Total	41,071	115,937	18.95
Tunas			
Albacore	11,963	15,447	2.52
Bigeye	17,689	18,214	2.98
Yellowfin	3,510	3,595	0.59
Other	1,304	1,330	0.22
Total	34,466	38,586	6.31
Miscellaneous	3,556	4,034	0.66

¹Blue and striped marlins are misidentified in some cases.²Blue sharks are incorrectly logged as "kept" in some cases.

Table 7.--Hawaii's domestic longline logbook summary by date of haul; from January-December 1992 (Swordfish trips; All areas).

Trip information			
Number of vessels		66	
Number of trips		288	
Number of sets		3,531	
Number of hooks set		2,811,710	
Number of light sticks used		2,125,230	
Minimum hooks per set		100	
Maximum hooks per set		1,500	
Species catch information			
Species class	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin ¹	490	564	0.20
Swordfish	39,095	41,503	14.76
Striped Marlin	1,787	2,184	0.78
Other	364	375	0.13
Total	41,736	44,626	15.87
Other Pelagic Management Unit Species			
Mahimahi	12,175	13,448	4.78
Wahoo	172	176	0.06
Sharks ²	452	55,507	19.74
Total	12,799	69,131	24.59
Tunas			
Albacore	5,714	8,680	3.09
Bigeye	4,166	4,533	1.61
Yellowfin	1,242	1,301	0.46
Other	102	112	0.04
Total	11,224	14,626	5.20
Miscellaneous	859	1,235	0.44

¹Blue and striped marlins are misidentified in some cases.

²Blue sharks are incorrectly logged as "kept" in some cases.

Table 8.--Hawaii's domestic longline logbook summary by date of haul; from January-December 1992 (Tuna trips; All areas).

Trip information			
Number of vessels	57		
Number of trips	468		
Number of sets	3,868		
Number of hooks set	5,236,840		
Number of light sticks used	38,800		
Minimum hooks per set	100		
Maximum hooks per set	2,310		
Species catch information			
Species class	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin ¹	1,881	1,925	0.37
Swordfish	1,236	1,400	0.27
Striped Marlin	11,006	11,207	2.14
Other	3,693	3,768	0.72
Total	17,816	18,300	3.49
Other Pelagic Management Unit Species			
Mahimahi	8,578	8,796	1.68
Wahoo	1,758	1,772	0.34
Sharks ²	2,170	12,599	2.41
Total	12,506	23,167	4.42
Tunas			
Albacore	4,460	4,516	0.86
Bigeye	24,294	24,828	4.74
Yellowfin	2,651	2,779	0.53
Other	2,719	2,755	0.53
Total	34,124	34,878	6.66
Miscellaneous	7,438	7,783	1.49

¹Blue and striped marlines are misidentified in some cases.

²Blue sharks are incorrectly logged as "kept" in some cases.

Table 9.--Hawaii's domestic longline logbook summary by date of haul; from January-December 1992 (Mixed trips; All areas)

Trip information			
Number of vessels		75	
Number of trips		547	
Number of sets		4,121	
Number of hooks set		3,638,031	
Number of light sticks used		1,162,879	
Minimum hooks per set		200	
Maximum hooks per set		2,000	
Species catch information			
Species	No. kept	No. caught	No. caught per 1,000 hooks
Billfish			
Blue Marlin ¹	2,007	2,017	0.55
Swordfish	30,693	31,370	8.62
Striped Marlin	2,558	2,574	0.71
Other	1,496	1,512	0.42
Total	36,754	37,473	10.30
Other Pelagic Management Unit Species			
Mahimahi	33,179	34,425	9.46
Wahoo	497	498	0.14
Sharks ²	983	26,780	7.36
Total	34,659	61,703	16.96
Tunas			
Albacore	6,092	6,609	1.82
Bigeye	14,292	14,373	3.95
Yellowfin	3,765	3,776	1.04
Other	622	626	0.17
Total	24,771	25,383	6.98
Miscellaneous	1,726	1,760	0.48

¹Blue and striped marlins are misidentified in some cases.

²Blue sharks are incorrectly logged as "kept" in some cases.

Table 10.--Number of interactions with endangered and protected species reported by Hawaii's domestic longline fleet January-December 1992. Numbers indicate animal count, not sets with interactions.¹

Endangered/protected species	No. released alive	No. released injured	No. released dead
Turtle:			
Green turtle	29		
Leatherback	32		
Loggerhead	2		
Olive ridley	1		
Dolphin:	1		1
False killer whale:	2		
Seabird:			
Albatross	18	8	65
Booby		3	6
Other: Unidentified species	7	2	3
TOTAL:	92	13	75

Table 10A.--Location of protected species interactions.

Endangered/protected species	Inside the EEZ (No.)	Outside the EEZ (No.)
Turtle	11	53
Dolphin	0	2
False killer whale	2	0
Seabird	15	85
Other species	1	11
TOTAL:	29	151

¹All data in these tables are unedited.

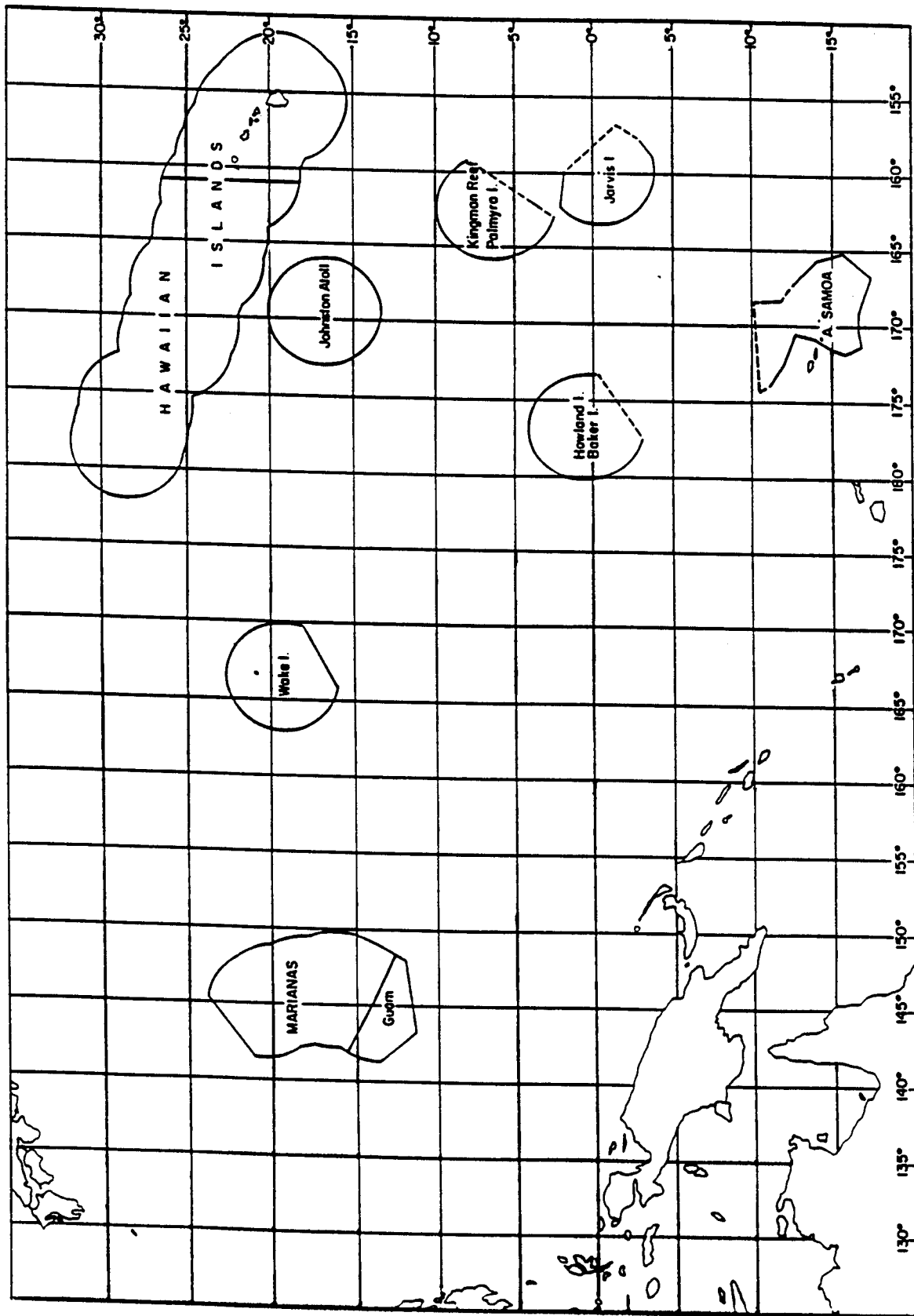


Figure 1.--Exclusive Economic Zones (3-200 nmi offshore around the Hawaiian Islands and U.S. possessions).

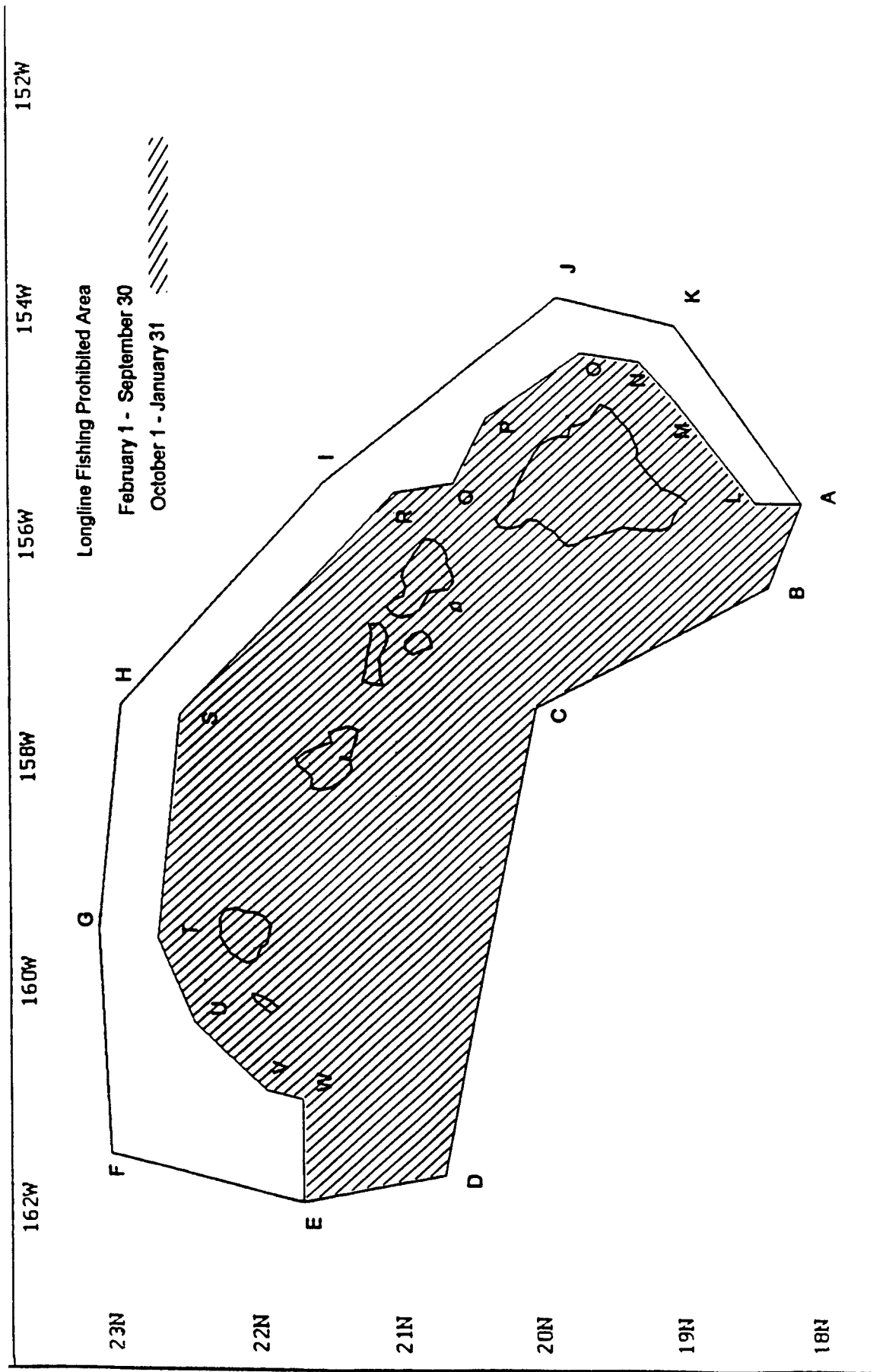
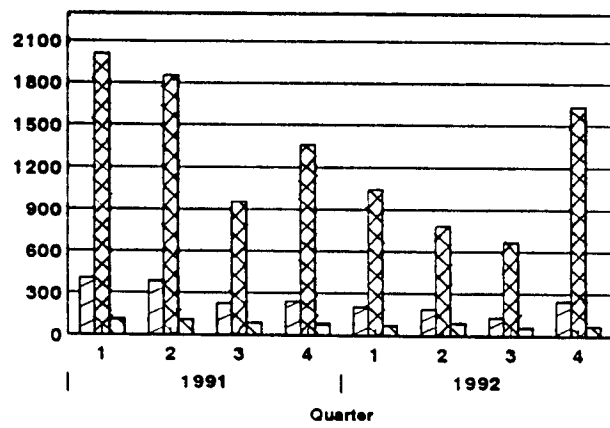


Figure 2A.--Closure zone. Prohibited longline fishing area around the main Hawaiian Islands (within 75 nmi of Kauai and Oahu, and 50 nmi of Maui and Hawaii) (February 1-September 30) and modified zone (25 nmi from windward shore of Kauai, Maui, and Hawaii County, and 50 nmi off windward coast of Oahu; October 1-January 31).

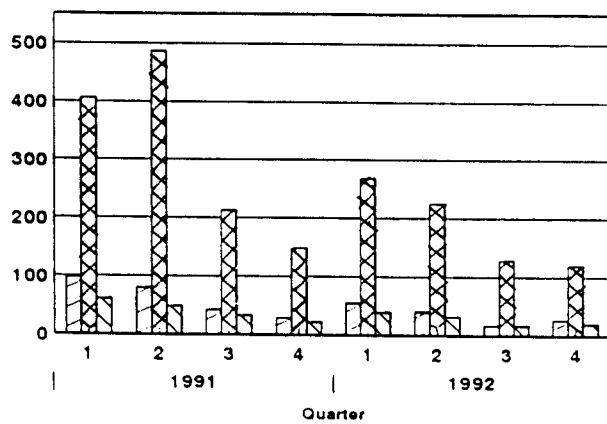
<u>POINTS</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
A	18°05'N	155°40'W
B	18°20'N	156°25'W
C	20°00'N	157°30'W
D	20°40'N	161°40'W
E	21°40'N	161°55'W
F	23°00'N	161°30'W
G	23°05'N	159°30'W
H	22°55'N	157°30'W
I	21°30'N	155°30'W
J	19°50'N	153°50'W
K	19°00'N	154°05'W
A*	18°05'N	155°40'W
L	18°25'N	155°40'W
M	19°00'N	154°45'W
N	19°15'N	154°25'W
O	19°40'N	154°20'W
P	20°20'N	154°55'W
Q	20°35'N	155°30'W
R	21°00'N	155°35'W
S	22°30'N	157°35'W
T	22°40'N	159°35'W
U	22°25'N	160°20'W
V	21°55'N	160°55'W
W	21°40'N	161°00'W
E*	21°40'N	161°55'W

Figure 2B.--Main Hawaiian Island prohibited longline fishing area boundary points (see plotted points on Figure 2A).

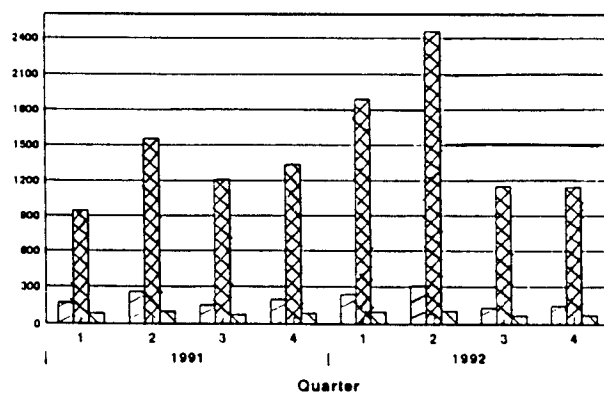
Main Hawaiian Islands EEZ



Northwestern Hawaiian Islands EEZ



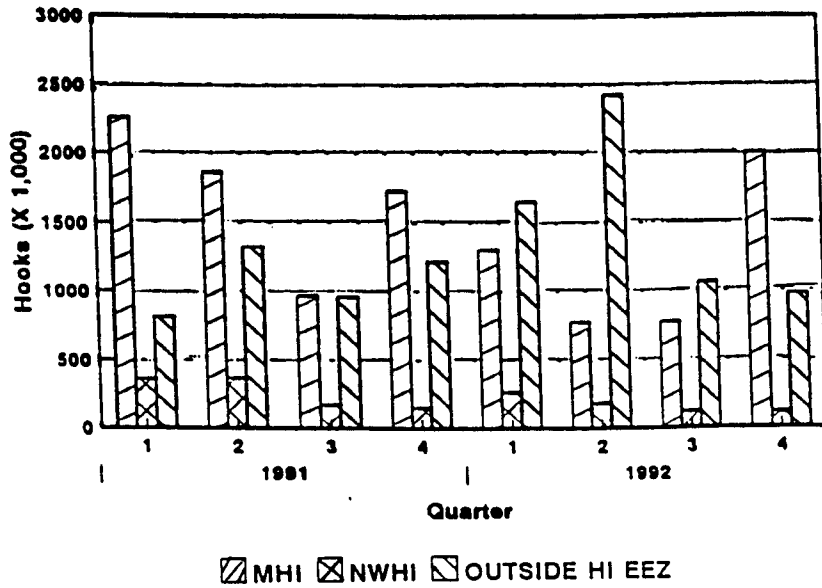
Outside Hawaii EEZ



Trips
 Sets
 Vessels

Figure 3.--Quarterly fishing effort by number of trips, sets, and vessels by Hawaii's domestic longline fleet (by area fished), January-December 1991-92.

A



B

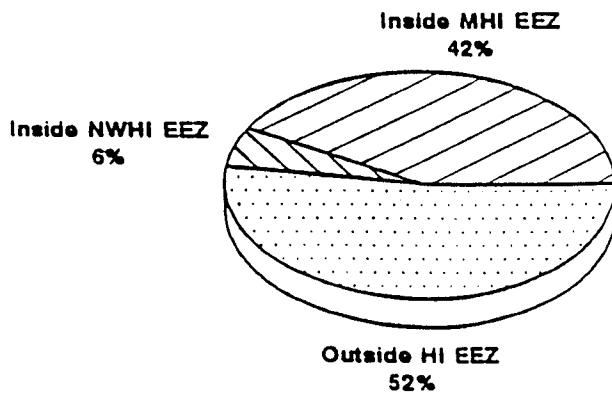
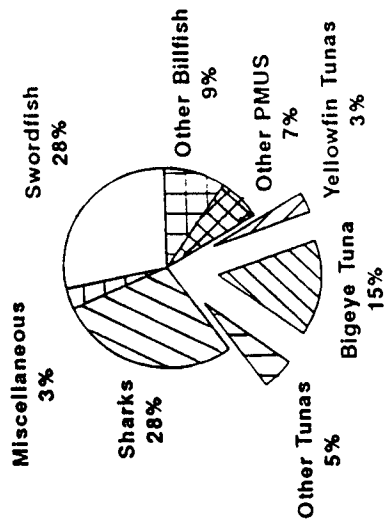
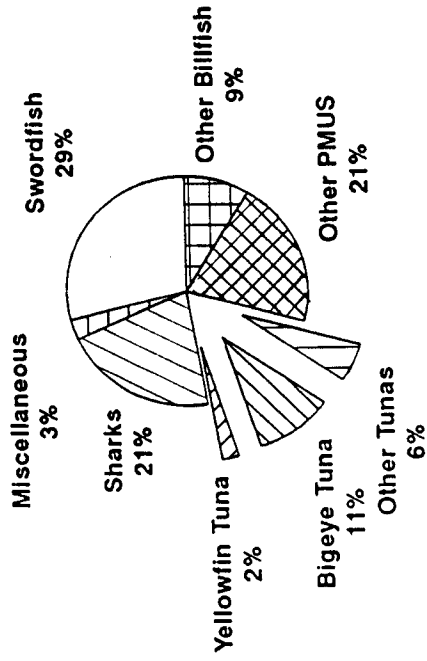


Figure 4.--Quarterly fishing effort by Hawaii's domestic longline fleet: (A) number of hooks set by area, January-December 1991-92; (B) percent of effort (number of hooks set) by area, January-December 1992.

January - March



April - June



23

October - December

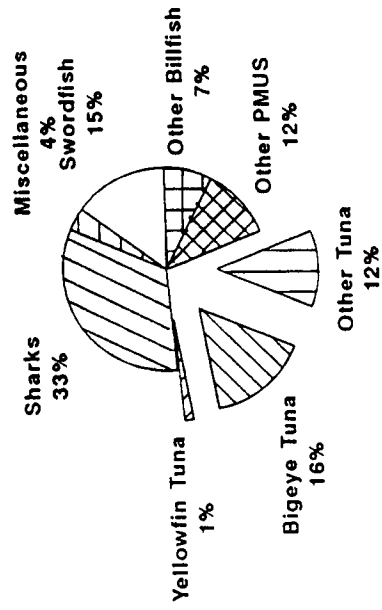
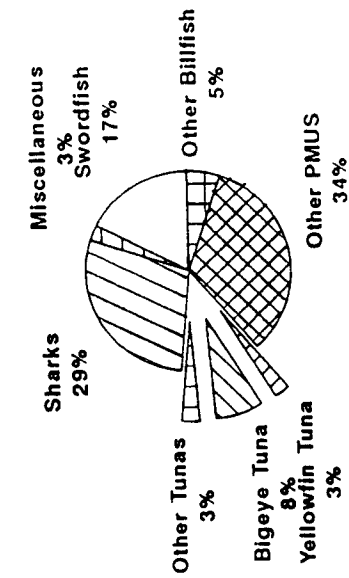


Figure 5.--Quarterly percent species composition (by number caught) by Hawaii's domestic longline fishing fleet, January-December 1992.

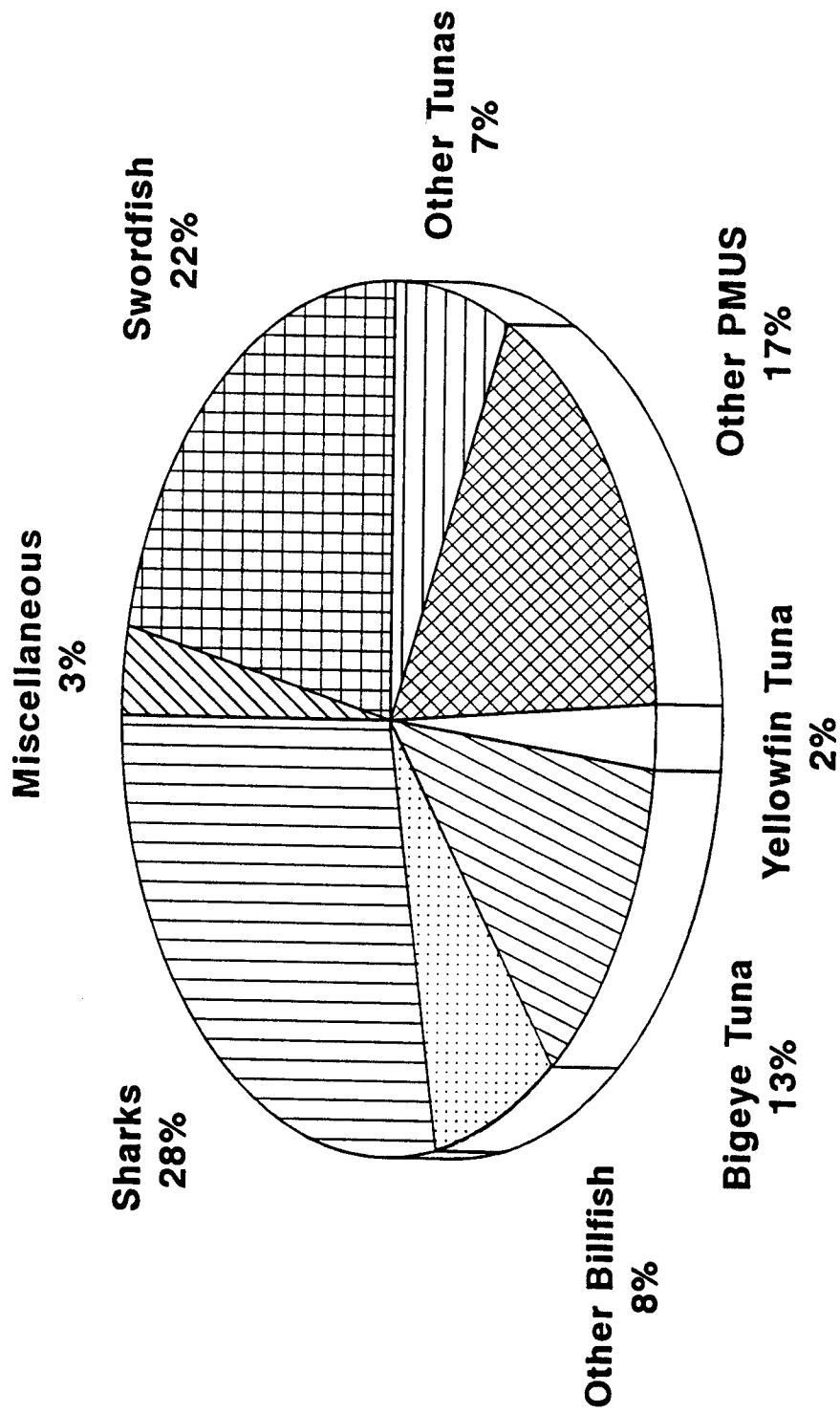


Figure 6.--Total percent species composition (by number caught) by Hawaii's domestic longline fishing fleet, January-December 1992.

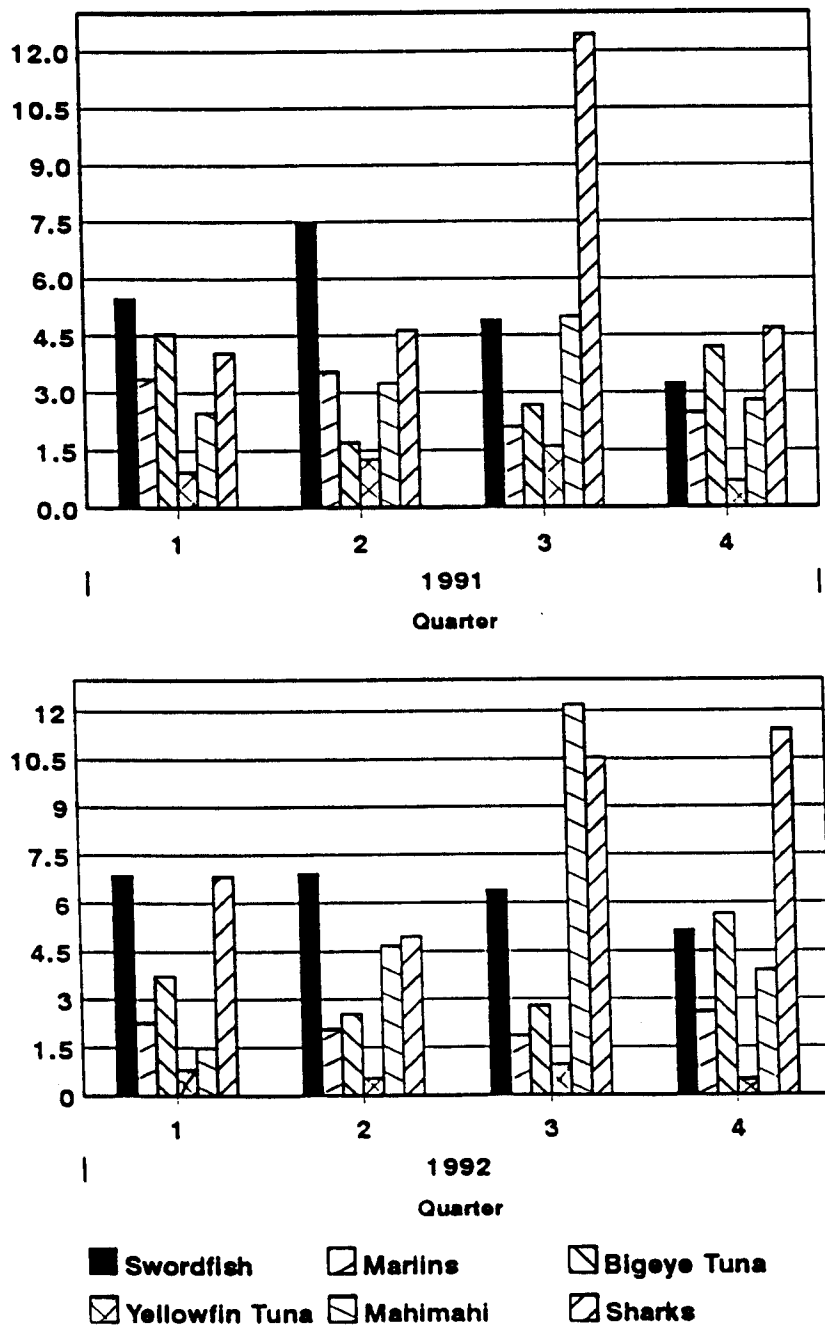


Figure 7.--Quarterly catch-per-unit effort (CPUE; catch per 1,000 hooks) of selected species by Hawaii's domestic longline fleet, January-December 1991-92.